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RE:	APPLICATION NO. 10/689,201	

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: STEWART et al. EXAMINER: Kim, K.

SERIAL NO.: 10/689,201 GROUP: 2611

FILED: October 20, 2003 CASE NO.: CS23403RL

ENTITLED: METHOD FOR MODULATION DETECTION

Motorola, Inc.
Intellectual Property Department
600 North U.S. Highway 45
Libertyville, IL 60048

APPEAL BRIEF UNDER 37 C.F.R. § 41.37

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Further to the Notice of Appeal filed on July 18, 2006, Applicant submits the present Appeal Brief.

TABLE OF CONTENTS

I. REAL PARTY IN INTEREST

The real party in interest is, Motorola, Inc.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

III. STATUS OF CLAIMS

Claims 1-28 are pending. Claims 1-6, 9-13, and 16-26 are rejected and are the subject of the present appeal.

IV. STATUS OF AMENDMENTS

Claims 7, 8, 14, 15, 27, and 28 and the specification were amended in a June 19, 2006 Amendment After Final Rejection. Applicants gratefully acknowledge that the July 10, 2006 February 10, 2003 Advisory Action entered the amendment.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Claim 1 is drawn to a method of modulation detection (Fig. 7). As an example, the method can include receiving a signal (710, page 13, lines 21-22) generating a first decision statistic (720, page 14, lines 5-6) based on the received signal the first decision statistic generated using an embedded interference-canceling algorithm (page 3, lines 28-30), phase rotating the received signal (725, page 14, lines 6-7), generating a second decision statistic (735, page 14, lines 8-10) based on the phase rotated received signal the second decision statistic generated using an embedded interference-canceling algorithm (page 3, lines 28-30), and determining a selected modulation type (740, 745, and 750, page 14, lines 10-12) based on comparing the first decision statistic with the second decision statistic.

Claim 9 is drawn to a method of modulation detection (Fig. 7). As an example, the method can include receiving a signal (710, page 4, line 31), constructing a first decision statistic based on a first hypothesized modulation type including interference suppression based on the received signal (720, page 4, line 31 - page 5, line2), constructing a second decision statistic based on a second hypothesized modulation type including interference suppression based on the received signal (735, page 5, lines 2-4), and identifying a selected modulation type based on a comparison of the first decision statistic and the second decision statistic (740, page 5, lines 4-5).

Claim 20 is drawn to a method of modulation detection (Fig. 7). As an example, the method can include receiving a signal (710, page 13, lines 21-22), generating a first observation matrix (715, page 14, lines 4-5) from the received signal, and computing first decision statistic from first observation matrix (720, page 14, lines 5-6) the first decision statistic generated using an embedded interference-canceling algorithm (page 3, lines 28-30). The method can also include phase-rotating the received signal (725, page 14, lines 6-7), generating a second observation matrix (730, page 14, lines 7-8) from the phase-rotated received signal, computing a second decision statistic from the second observation matrix (735, page 14, lines 8-10) the second decision statistic generated using an embedded interference-canceling algorithm (page 3, lines 28-30), comparing (740, page 14, lines 10-11) the first decision statistic with the second decision statistic, determining a desired modulation to be a Gaussian minimum shift keying modulation if the first statistic is less than or equal to the second statistic, and determining a desired modulation to be an octal phase shift keying modulation if the second statistic is less than the first statistic (745, 750, page 14, lines 11-12).

Claim 21 is drawn to a communication device (Fig. 9). The communication device can include a receiver configured to receive a signal (950, page 15, lines 21-22, page 16, lines 6-7) and a modulation detector configured to detect a modulation type of the received signal (990, page 16, line 9). The modulation detector can include a first decision statistic generator (992) configured to generate a first decision statistic based on the received signal the first decision statistic generated using an embedded interference-canceling algorithm (page 16, lines 10-11 and page 3, lines 28-30), a phase rotator (994) configured to phase rotate the received signal (page 16, lines 11-12), a second decision statistic generator (996) configured to generate a second decision statistic based on the phase rotated received signal the second

decision statistic generated using an embedded interference-canceling algorithm (page 16, lines 12-13 and page 3, lines 28-30), and a determination module (998) configured to determine a selected modulation type based on comparing the first decision statistic with the second decision statistic (page 16, lines 13-15).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. Whether claims 1-6, 9-13, and 16-26 are allowable under 35 U.S.C. § 102 over Khullar et al. (U.S. Patent No. 6,400,928).

2. Whether claims 1-6, 9, 11-13, 16, and 18-26 are allowable under 35 U.S.C. § 103, over Khullar et al.

VII. ARGUMENT

<u>Claims 1, 20, and 21</u>

<u>Claim Limitations At Issue</u>

As an example, in Claim 1, the limitations at issue are italicized below:

1. A method of modulation detection, comprising:
receiving a signal;
generating a first decision statistic based on the received signal the first decision statistic generated using an embedded interference-canceling algorithm;
phase rotating the received signal;
generating a second decision statistic based on the phase rotated received signal the second decision statistic generated using an embedded interference-canceling algorithm; and
determining a selected modulation type based on comparing the first decision statistic with the second decision statistic.

<u>Examiner's Allegation</u>

Claims 1, 20, and 21 stand rejected under 35 U.S.C. § 102 and 35 U.S.C. § 103 over Khullar et al.

Applicants' Argument

Applicants assert that Khullar et al. does not disclose or suggest generating a decision statistic based on the received signal the decision statistic generated using an embedded interference-canceling algorithm, as recited in independent claim 1 and similarly recited in independent claims 20 and 21.

Regarding the rejection under 35 U.S.C. § 102, "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference" (MPEP §2131, citing *Verdegaal Bros. v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)).

Also, regarding the rejection under 35 U.S.C. § 103, To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the reference or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references, when combined, must teach or suggest all of the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure (MPEP 2142). The prior art must suggest the desirability of the claimed invention (MPEP 2143.01).

Khullar et al. discloses a method and system for blind detection of modulation (col. 1, lines 1-9). A radio front end section 64 receives bursts. A first de-rotation block 68(1) de-rotates a training sequence according to the rotation used for GMSK, while another de-rotation block 68(n) de-rotates the training sequence according to the rotation used for 8-PSK. In addition, other de-rotation blocks 68 can be included if other modulation schemes are used. A first synchronization/channel estimation block 70(1) correlates the de-rotated training sequence from the first de-rotation block 68(1) to the known training sequence to calculate a GMSK correlation quality measure and attempts to synchronize the receiving station 60 with the received burst 16, and another synchronization/channel estimation block 70(n) correlates

the de-rotated training sequence from the other de-rotation block 68(n) to the known training sequence to calculate an 8-PSK correlation quality measure and attempts to synchronize the receiving station 60 with the received burst 16. These correlation quality measures are then used by a modulation detection unit 72 to determine which modulation scheme was most likely used for the burst 16. Generally, the correlation quality measure with the highest value will indicate that the modulation scheme that corresponds to that correlation quality measure was used for the transmission. Accordingly, the modulation detection unit 72 selects the corresponding modulation scheme for the burst 16 (col. 8, lines 24-67).

Khullar et al. does not disclose or suggest generating a decision statistic based on the received signal the decision statistic generated using an embedded interference-canceling algorithm, as recited in independent claim 1 and similarly recited in independent claims 20 and 21 and such was not asserted by the original Office Action.

In the Response to Amendment section, the final Office Action alleged, "An embodiment of the claimed embedded interference-canceling algorithm is described in the present specification to use a training sequence. See page 3, 3rd paragraph. Because Khullar et al also teaches generating a correlation quality measure (reading on the decision statistic) using a training sequence for modulation detection, it is seen that the correlation quality is generating using an embedded interference-canceling algorithm in the Khullar et al patent..." Applicants disagree.

Initially, Applicants cannot ascertain what the final Office Action was referring to when it stated "See page 3, 3rd paragraph." In particular, the third full paragraph on page 3 only states "Fig. 3 is an exemplary illustration of a Gray-encoded 8-PSK constellation according to one embodiment." This does not describe an embedded interference canceling algorithm. Thus, the foundation of the final Office Action's argument was flawed.

Furthermore, Applicants assert Khullar et al. does not disclose the correlation quality is generating using an embedded interference-canceling algorithm, as alleged by the Office Action. In fact, the final Office Action appeared to admit such is not taught because the Office Action engaged in a convolution to allege such is implied or inferred from Khullar et al. Unfortunately, such is not true. In particular, the correlation quality measure referred to by Khullar et al is understood to one of ordinary skill in the art to be the standard correlation defined in standard telecommunication text books. Using the notation in the original specification, these correlation measures can be written as $\varepsilon_0 = \mathbf{b}^T \mathbf{Z}_0 \mathbf{Z}_0^T \mathbf{b}$ and

$\varepsilon_1 = \mathbf{b}^T\mathbf{Z}_1\mathbf{Z}_1^T\mathbf{b}$ for GMSK and 8-PSK respectively. Based on which of these measures is larger, the corresponding modulation is chosen. These measures assume that the interference is white and has no structure to enable interference cancellation. In fact, the final Office Action did not show a clear understanding of standard terminology used in telecommunication literature. In particular, those skilled in the art would clearly understand from a reading of the claims in Khullar, et al. that the "correlation quality measure" described in Khullar, et al. refers to standard correlation measures and not the claimed feature. More particularly, Khullar et al. does not disclose, and one of ordinary skill in the art would not infer that one could replace those measures with other measures like the claimed features. It is also not taught that an interference canceling algorithm can be embedded to come up with an improved measure such as those claimed. Thus, Khullar et al. does not disclose the correlation quality is generating using an embedded interference-canceling algorithm.

The Advisory Action alleged "the third paragraph of the present specification mentions that 'Fig. 2 is an illustration of an exemplary set of training sequence codes selectable in a GSM network according to one embodiment...' This statement and its related descriptions, that must be familiar with applicant as it is applicant's own disclosure, indicates that the interference canceling algorithm is merely the use of training sequence, just as true in the prior art reference." Applicants disagree.

Applicants assert the present specification does not indicate that the interference canceling algorithm is merely the use of a training sequence. In particular, as previously described, the correlation quality measure referred to by Khullar et al is understood to one of ordinary skill in the art to be the standard correlation defined in standard telecommunication text books. Using the notation in the original specification, these correlation measures can be written as $\varepsilon_0 = \mathbf{b}^T\mathbf{Z}_0\mathbf{Z}_0^T\mathbf{b}$ and $\varepsilon_1 = \mathbf{b}^T\mathbf{Z}_1\mathbf{Z}_1^T\mathbf{b}$ for GMSK and 8-PSK respectively. These measures assume that the interference is white and <u>has no structure to enable interference cancellation</u>. Thus, Khullar et al. does not teach, and it is not obvious that an interference cancelling algorithm can be embedded in the teachings of Khullar et al.

The Advisory Action then alleged "Applicant contends that the correlation quality measure described in Khullar et al. would not be understood as referring to the claimed feature. However, the claims only require 'a first decision statistic' and 'a second decision statistic' the scope of each of which is broad enough to include the correlation quality measure,

which is also a decision statistic, based on an interference suppression algorithm, i.e., one using a training sequence." Applicants disagree.

Applicants assert the scope of a decision statistic is not broad enough to include the correlation quality measure, which is also a decision statistic, based on an interference suppression algorithm. There is no teaching in Khullar et al. that a correlation quality measure based on an interference suppression algorithm is a decision statistic generated using an embedded interference-canceling algorithm. The Advisory Action has provided no support for such an allegation and the feature is entirely missing from the cited reference. Thus, the scope of a decision statistic is not broad enough to include the correlation quality measure, which is also a decision statistic, based on an interference suppression algorithm and there is no basis for such an allegation.

Accordingly, kindly reverse and vacate the rejection of claims 1, 20, and 21 under 35 U.S.C. § 102 and 35 U.S.C. § 103.

Claim 9

Claim Limitations At Issue

In Claim 9, the limitations at issue are italicized below:

9. A method of modulation detection, comprising:
receiving a signal;
constructing a first decision statistic based on a first hypothesized modulation type including interference suppression based on the received signal;
constructing a second decision statistic based on a second hypothesized modulation type including interference suppression based on the received signal; and
identifying a selected modulation type based on a comparison of the first decision statistic and the second decision statistic.

Examiner's Allegation

Claim 9 stands rejected under 35 U.S.C. § 102 and 35 U.S.C. § 103 over Khullar et al.

Applicants' Argument

Applicants assert that Khullar et al. does not disclose or suggest constructing a first decision statistic based on a first hypothesized modulation type including interference suppression based on the received signal, as recited in independent claim 9.

Regarding the rejection under 35 U.S.C. § 102, "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference" (MPEP §2131, citing *Verdegaal Bros. v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)).

Also, regarding the rejection under 35 U.S.C. § 103, To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the reference or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references, when combined, must teach or suggest all of the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure (MPEP 2142). The prior art must suggest the desirability of the claimed invention (MPEP 2143.01).

Khullar et al. discloses a method and system for blind detection of modulation (col. 1, lines 1-9). A radio front end section 64 receives bursts. A first de-rotation block 68(1) de-rotates a training sequence according to the rotation used for GMSK, while another de-rotation block 68(n) de-rotates the training sequence according to the rotation used for 8-PSK. In addition, other de-rotation blocks 68 can be included if other modulation schemes are used. A first synchronization/channel estimation block 70(1) correlates the de-rotated training sequence from the first de-rotation block 68(1) to the known training sequence to calculate a GMSK correlation quality measure and attempts to synchronize the receiving station 60 with the received burst 16, and another synchronization/channel estimation block 70(n) correlates the de-rotated training sequence from the other de-rotation block 68(n) to the known training sequence to calculate an 8-PSK correlation quality measure and attempts to synchronize the receiving station 60 with the received burst 16. These correlation quality measures are then used by a modulation detection unit 72 to determine which modulation scheme was most

likely used for the burst 16. Generally, the correlation quality measure with the highest value will indicate that the modulation scheme that corresponds to that correlation quality measure was used for the transmission. Accordingly, the modulation detection unit 72 selects the corresponding modulation scheme for the burst 16 (col. 8, lines 24-67).

Khullar et al. does not disclose or suggest constructing a first decision statistic based on a first hypothesized modulation type including interference suppression based on the received signal, as recited in independent claim 9, and such was not asserted by the Office Action.

In the Response to Amendment section, the final Office Action alleged, "An embodiment of the claimed embedded interference-canceling algorithm is described in the present specification to use a training sequence. See page 3, 3rd paragraph. Because Khullar et al also teaches generating a correlation quality measure (reading on the decision statistic) using a training sequence for modulation detection, it is seen that the correlation quality is generating using an embedded interference-canceling algorithm in the Khullar et al patent..." Applicants disagree.

Initially, it cannot be ascertained what the Office Action was referring to when it states "See page 3, 3rd paragraph." In particular, the third full paragraph on page 3 only states "Fig. 3 is an exemplary illustration of a Gray-encoded 8-PSK constellation according to one embodiment." This does not describe an embedded interference canceling algorithm. Thus, the foundation of the Office Action's argument was flawed.

Furthermore, Applicants assert Khullar et al. does not disclose the correlation quality is constructed based on a first hypothesized modulation type including interference suppression, as alleged by the Office Action. In fact, the Office Action appears to admit such is not taught because the Office Action engaged in a convolution to allege such is implied or inferred from Khullar et al. Unfortunately, such is not true. In particular, the correlation quality measure referred to by Khullar et al is understood to one of ordinary skill in the art to be the standard correlation defined in standard telecommunication text books. Using the notation in the original specification, these correlation measures can be written as $\varepsilon_0 = \mathbf{b}^T \mathbf{Z}_0 \mathbf{Z}_0^T \mathbf{b}$ and $\varepsilon_1 = \mathbf{b}^T \mathbf{Z}_1 \mathbf{Z}_1^T \mathbf{b}$ for GMSK and 8-PSK respectively. Based on which of these measures is larger, the corresponding modulation is chosen. These measures assume that the interference is white and has no structure to enable interference suppression. In fact, the final Office Action did not show a clear understanding of standard terminology used in telecommunication literature. In

particular, those skilled in the art would clearly understand from a reading of the claims in Khullar, et al. that the "correlation quality measure" described in Khullar, et al. refers to standard correlation measures and not the claimed feature. More particularly, Khullar et al. does not disclose, and one of ordinary skill in the art would not infer that one could replace those measures with other measures like the claimed features. Thus, Khullar et al. does not disclose a decision statistic is constructed based on a first hypothesized modulation type including interference suppression.

The Advisory Action alleged "the third paragraph of the present specification mentions that 'Fig. 2 is an illustration of an exemplary set of training sequence codes selectable in a GSM network according to one embodiment...' This statement and its related descriptions, that must be familiar with applicant as it is applicant's own disclosure, indicates that the interference canceling algorithm is merely the use of training sequence, just as true in the prior art reference." Applicants disagree.

Applicants assert the present specification does not indicate that the interference canceling algorithm is merely the use of a training sequence. In particular, as previously described, the correlation quality measure referred to by Khullar et al is understood to one of ordinary skill in the art to be the standard correlation defined in standard telecommunication text books. Using the notation in the original specification, these correlation measures can be written as $\varepsilon_0 = \mathbf{b}^T\mathbf{Z}_0\mathbf{Z}_0^T\mathbf{b}$ and $\varepsilon_1 = \mathbf{b}^T\mathbf{Z}_1\mathbf{Z}_1^T\mathbf{b}$ for GMSK and 8-PSK respectively. These measures assume that the interference is white and <u>have no structure to enable interference suppression</u>. Thus, Khullar et al. does not teach, and it is not obvious that a decision statistic is constructed based on a first hypothesized modulation type including interference suppression.

The Advisory Action then alleges "Applicant contends that the correlation quality measure described in Khullar et al. would not be understood as referring to the claimed feature. However, the claims only require 'a first decision statistic' and 'a second decision statistic' the scope of each of which is broad enough to include the correlation quality measure, which is also a decision statistic, based on an interference suppression algorithm, i.e., one using a training sequence." Applicants disagree.

Applicants assert the scope of a decision statistic is not broad enough to include constructing a decision statistic based on a first hypothesized modulation type including interference suppression. There is no teaching in Khullar et al. that a correlation quality

measure based on an interference suppression algorithm is a decision statistic based on a first hypothesized modulation type including interference suppression. The Advisory Action has provided no support for such an allegation. Thus, the scope of the claimed decision statistic is not broad enough to include the correlation quality measure taught in Khullar et al.

Accordingly, kindly reverse and vacate the rejection of claim 9 under 35 U.S.C. § 102 and 35 U.S.C. § 103, with instructions for the Examiner to allow the present application.

CONCLUSION

In view of the discussion above, the claims of the present application are in condition for allowance. Kindly withdraw any rejections and objections and allow this application to issue as a United States Patent without further delay.

The Commissioner is hereby authorized to deduct the fees for filing a brief in support of an appeal and any fees arising as a result of this Appeal Brief or any other communication from or to credit any overpayments to Deposit Account No. 50-2117.

Respectfully submitted,

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Dated: October 15, 2006

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VIII. CLAIMS APPENDIX

1. (previously presented) A method of modulation detection, comprising:

receiving a signal;

generating a first decision statistic based on the received signal the first decision statistic generated using an embedded interference-canceling algorithm;

phase rotating the received signal;

generating a second decision statistic based on the phase rotated received signal the second decision statistic generated using an embedded interference-canceling algorithm; and

determining a selected modulation type based on comparing the first decision statistic with the second decision statistic.

2. (original) The method according to claim 1, further comprising generating an observation matrix from the received signal, wherein the first decision statistic is generated based on the observation matrix.

3. (original) The method according to claim 1, further comprising generating an observation matrix from the phase-rotated received signal, wherein the second decision statistic is generated based on the observation matrix.

4. (original) The method according to claim 1, wherein the step of determining a selected modulation type further comprises:

comparing the first decision statistic with the second decision statistic;

determining a desired modulation to be a first modulation type if the first decision statistic is less than or equal to the second decision statistic; and

determining a desired modulation to be a second modulation type if the second decision statistic is less than the first decision statistic.

5. (original) The method according to claim 1, wherein the step of determining a selected modulation type determines the selected modulation type to be at least one of a Gaussian minimum shift keying modulation type and an octal phase shift keying modulation type based on comparing the first decision statistic with the second decision statistic.

6. (original) The method according to claim 1, wherein generating a first decision statistic further comprises generating the first decision statistic based on four bursts comprising a radio link control bock of the received signal.

7. (previously presented) The method according to claim 1, wherein the first decision statistic is generated according to $\varepsilon_0 = \mathbf{b}^T(I - \mathbf{Z}_0(\mathbf{Z}_0^T\mathbf{Z}_0)^{-1}\mathbf{Z}_0^T)\mathbf{b}$.

8. (previously presented) The method according to claim 1, wherein the second decision statistic is generated according to $\varepsilon_1 = \mathbf{b}^T(I - \mathbf{Z}_1(\mathbf{Z}_1^T\mathbf{Z}_1)^{-1}\mathbf{Z}_1^T)\mathbf{b}$.

9. (original) A method of modulation detection, comprising:

receiving a signal;

constructing a first decision statistic based on a first hypothesized modulation type including interference suppression based on the received signal;

constructing a second decision statistic based on a second hypothesized modulation type including interference suppression based on the received signal; and

identifying a selected modulation type based on a comparison of the first decision statistic and the second decision statistic.

10. (original) The method according to claim 9, wherein the first hypothesized modulation type is a Gaussian minimum shift keying modulation type.

11. (original) The method according to claim 9, wherein the second hypothesized modulation type is an octal phase shift keying modulation type.

12. (original) The method according to claim 9, further comprising:

transforming the received signal,

wherein the second decision statistic is based on the transformed received signal.

13. (original) The method according to claim 12, wherein transforming the received signal further comprises phase rotating the received signal.

14. (previously presented) The method according to claim 9, wherein the first decision statistic is generated according to $\varepsilon_0 = \mathbf{b}^T(I - \mathbf{Z}_0(\mathbf{Z}_0^T\mathbf{Z}_0)^{-1}\mathbf{Z}_0^T)\mathbf{b}$.

15. (previously presented) The method according to claim 9, wherein the second decision statistic is generated according to $\varepsilon_1 = \mathbf{b}^T(I - \mathbf{Z}_1(\mathbf{Z}_1^T\mathbf{Z}_1)^{-1}\mathbf{Z}_1^T)\mathbf{b}$.

16. (original) The method according to claim 9, wherein the step of identifying a selected modulation type further comprises:

comparing the first decision statistic with the second decision statistic;

determining a desired modulation to be a first modulation type if the first decision statistic is less than or equal to the second decision statistic; and

determining a desired modulation to be a second modulation type if the first decision statistic is less than the second decision statistic.

17. (original) The method according to claim 16, wherein the first modulation type is a Gaussian minimum shift keying modulation type.

18. (original) The method according to claim 16, wherein the first modulation type is an octal phase shift keying modulation type.

19. (original) The method according to claim 9, wherein constructing a first and second decision statistic further comprises constructing the respective first and second decision statistics based on four bursts comprising a radio link control block of the received signal.

20. (previously presented) A method of modulation detection, comprising:

receiving a signal;

generating a first observation matrix from the received signal;

computing first decision statistic from first observation matrix the first decision statistic generated using an embedded interference-canceling algorithm;

phase-rotating the received signal;

generating a second observation matrix from the phase-rotated received signal;

computing a second decision statistic from the second observation matrix the second decision statistic generated using an embedded interference-canceling algorithm;

comparing the first decision statistic with the second decision statistic;

determining a desired modulation to be a Gaussian minimum shift keying modulation if the first statistic is less than or equal to the second statistic; and

determining a desired modulation to be an octal phase shift keying modulation if the second statistic is less than the first statistic.

21. (previously presented) A communication device comprising:

a receiver configured to receive a signal; and

a modulation detector configured to detect a modulation type of the received signal, the modulation detector including:

a first decision statistic generator configured to generate a first decision statistic based on the received signal the first decision statistic generated using an embedded interference-canceling algorithm;

a phase rotator configured to phase rotate the received signal;

a second decision statistic generator configured to generate a second decision statistic based on the phase rotated received signal the second decision statistic generated using an embedded interference-canceling algorithm; and

a determination module configured to determine a selected modulation type based on comparing the first decision statistic with the second decision statistic.

22. (original) The communication device according to claim 21, wherein the first decision statistic generator is further configured to generate an observation matrix from the received signal, wherein the first decision statistic is generated based on the observation matrix.

23. (original) The communication device according to claim 21, wherein the second decision statistic generator is further configured to generate an observation matrix from the phase-rotated received signal, wherein the second decision statistic is generated based on the observation matrix.

24. (original) The communication device according to claim 21, wherein the determination module is further configured to determine a selected modulation type by comparing the first decision statistic with the second decision statistic, determining a desired modulation to be a first modulation type if the first decision statistic is less than or equal to the second decision statistic, and determining a desired modulation to be a second modulation type if the second decision statistic is less than the first decision statistic.

25. (original) The communication device according to claim 21, wherein the determination module is further configured to determine a selected modulation type by determining the selected modulation type to be at least one of a Gaussian minimum shift keying modulation type and an octal phase shift keying modulation type based on comparing the first decision statistic with the second decision statistic.

26. (original) The communication device according to claim 21, wherein the first decision statistic generator is further configured to generate a first decision statistic by generating the first decision statistic based on four bursts comprising a radio link control bock of the received signal.

27. (previously presented) The communication device according to claim 21, wherein the first decision statistic is generated according to $\varepsilon_0 = \mathbf{b}^T(I - \mathbf{Z}_0(\mathbf{Z}_0^T\mathbf{Z}_0)^{-1}\mathbf{Z}_0^T)\mathbf{b}$.

28. (currently amended) The communication device according to claim 21, wherein the second decision statistic is generated according to $\varepsilon_1 = \mathbf{b}^T(I - \mathbf{Z}_1(\mathbf{Z}_1^T\mathbf{Z}_1)^{-1}\mathbf{Z}_1^T)\mathbf{b}$.

EVIDENCE APPENDIX (none)

RELATED PROCEEDINGS APPENDIX (none)